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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/543,031	07/21/2005	Thanasis Loupas	US030029 US	8976

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EXAMINER	
CWERN, JONATHAN	
ART UNIT	PAPER NUMBER
3737	
MAIL DATE	DELIVERY MODE
08/28/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/543,031	LOUPAS, THANASIS	
	Examiner	Art Unit	
	Jonathan G. Cwern	3737	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 June 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17 and 19-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17 and 19-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/3/09 has been entered.

Claim Objections

Claims 1-14 are objected to because of the following informalities:

In claim 1, “the motion data of the pixels" lacks antecedent basis.

In claim 6, "the motion data" lacks antecedent basis.

More specifically, no motion data is previously claimed before these limitations, there are only recitations of having motion **present** in an image. This is distinctly different from obtaining motion data. The presence of motion in an image does not necessarily mean any type of data is acquired in regards to that motion. The claims require a positive recitation of obtaining motion data.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Goujon (US 5941826).

Goujon shows a method for displaying the distribution of a motion characteristic occurring at a region of interest in a two or three dimensional ultrasound image of the body comprising (column 4, lines 5-15): acquiring a sequence of spatially dimensioned ultrasound images in which a motion characteristic is displayed (column 6, lines 10-60); delineating a region of interest (ROI) in one of the images where motion is present in the image (column 7, lines 30-40); processing the motion data from image points of the delineated ROI to determine the distribution of a motion characteristic as a function of time (column 6, lines 10-60); and displaying the distribution of the motion characteristic as a function of time (column 6, lines 10-60); displaying a spectrogram (the histogram is called a Doppler spectrum, column 6, lines 10-60). Also, the images are color images and can be stored in a buffer (the memory is a buffer, column 6, lines 10-60); displaying an image of the ROI where the spectrogram is concurrently displayed (column 13, lines 35-55, and Figure 8); wherein the motion comprises blood flow velocity (distribution of speed and blood flow rate, column 4, lines 5-15); wherein the motion comprises tissue

motion velocity (displacement of vessel walls, column 4, lines 5-15); wherein the motion comprises blood flow velocity derivatives (the amount of blood present is calculated over a change in time, this can be interpreted to be calculating blood flow velocity derivatives, the change in the amount of blood in a particular segment of the vessel over the change in time, column 6, lines 10-60); delineating a plurality of pixels in the images (user selects a vessel of interest to be segmented (delineated), the vessel will comprises a plurality of pixels, column 7, lines 25-40). In addition, Goujon shows that to obtain data regarding the instantaneous blood flow rate, the method can be applied by spatial integration over a section of the blood vessel. That is, the data is acquired from multiple, spatially discrete locations in the blood vessel and analyzed to determine the instantaneous blood flow rate (column 3, line 63-column 4, line 12).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goujon (US 5941826) in view of Guracar et al. (US 6464640).

Goujon shows a method for displaying the distribution of a motion characteristic occurring at a region of interest in a two or three dimensional ultrasound image of the

body comprising (column 4, lines 5-15): acquiring a sequence of spatially dimensioned ultrasound images in which a motion characteristic is displayed (column 6, lines 10-60); delineating a region of interest (ROI) in one of the images where motion is present in the image (column 7, lines 30-40); processing the motion data from image points of the delineated ROI to determine the distribution of a motion characteristic as a function of time (column 6, lines 10-60); and displaying the distribution of the motion characteristic as a function of time (column 6, lines 10-60); displaying a spectrogram (the histogram is called a Doppler spectrum, column 6, lines 10-60). Also, the images are color images and can be stored in a buffer (the memory is a buffer, column 6, lines 10-60); displaying an image of the ROI where the spectrogram is concurrently displayed (column 13, lines 35-55, and Figure 8); wherein the motion comprises blood flow velocity (distribution of speed and blood flow rate, column 4, lines 5-15); wherein the motion comprises tissue motion velocity (displacement of vessel walls, column 4, lines 5-15); wherein the motion comprises blood flow velocity derivatives (the amount of blood present is calculated over a change in time, this can be interpreted to be calculating blood flow velocity derivatives, the change in the amount of blood in a particular segment of the vessel over the change in time, column 6, lines 10-60); delineating a plurality of pixels in the images (user selects a vessel of interest to be segmented (delineated), the vessel will comprises a plurality of pixels, column 7, lines 25-40). In addition, Goujon shows that to obtain data regarding the instantaneous blood flow rate, the method can be applied by spatial integration over a section of the blood vessel. That is, the data is acquired from

multiple, spatially discrete locations in the blood vessel and analyzed to determine the instantaneous blood flow rate (column 3, line 63-column 4, line 12).

Guracar et al. disclose methods and apparatus for ultrasound imaging with automatic color image positioning. Guracar et al. teach that histograms can be formed from Doppler signals from multiple spatial locations in a region of interest (column 3, lines 15-25 and column 13, line 54-column 15, line 60).

It appears that Goujon shows acquiring data from multiple spatially discrete locations, but even if one were to interpret Goujon as not disclosing that limitation, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have applied the system of Goujon over multiple spatial locations as taught by Guracar et al. in order to evaluate a larger segment of the blood vessel, and to obtain additional useful data regarding blood flow. Applying Doppler pulses over multiple spatial locations as opposed to a single location is a well known expedient in the art and it would be obvious for one of ordinary skill in the art to do so when obtaining data regarding blood flow in a vessel. Obtaining data over a region rather than from a single point yields additional useful data regarding the region. In the specific case of blood flow in a blood vessel, applying pulses over a region can aid in locating where a stenosis may be formed, or may aid in calculating specific values related to the blood flow such as blood flow rate, speed, velocity, etc.

Claims 15-17 and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goujon (US 5941826) in view of Mo et al. (US 6142943).

Goujon shows a method for displaying the distribution of a motion characteristic occurring at a region of interest in a two or three dimensional ultrasound image of the body comprising (column 4, lines 5-15): acquiring a sequence of spatially dimensioned ultrasound images in which a motion characteristic is displayed (column 6, lines 10-60); delineating a region of interest (ROI) in one of the images where motion is present in the image (column 7, lines 30-40); processing the motion data from image points of the delineated ROI to determine the distribution of a motion characteristic as a function of time (column 6, lines 10-60); and displaying the distribution of the motion characteristic as a function of time (column 6, lines 10-60); displaying a spectrogram (the histogram is called a Doppler spectrum, column 6, lines 10-60). Also, the images are color images and can be stored in a buffer (the memory is a buffer, column 6, lines 10-60); displaying an image of the ROI where the spectrogram is concurrently displayed (column 13, lines 35-55, and Figure 8); wherein the motion comprises blood flow velocity (distribution of speed and blood flow rate, column 4, lines 5-15); wherein the motion comprises tissue motion velocity (displacement of vessel walls, column 4, lines 5-15); wherein the motion comprises blood flow velocity derivatives (the amount of blood present is calculated over a change in time, this can be interpreted to be calculating blood flow velocity derivatives, the change in the amount of blood in a particular segment of the vessel over the change in time, column 6, lines 10-60); delineating a plurality of pixels in the images (user selects a vessel of interest to be segmented (delineated), the vessel will comprises a plurality of pixels, column 7, lines 25-40). In addition, Goujon shows that to obtain data regarding the instantaneous blood flow rate, the method can be applied by

spatial integration over a section of the blood vessel. That is, the data is acquired from multiple, spatially discrete locations in the blood vessel and analyzed to determine the instantaneous blood flow rate (column 3, line 63-column 4, line 12).

Goujon fails to specifically mention the use of a beamformer coupled to the ultrasound probe.

Mo et al. disclose a Doppler ultrasound automatic spectrum optimization technique. Mo et al. teach a beamformer connected to the probe (column 3, lines 30-45, and Figure 1).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have had a beamformer connected to the ultrasound probe as taught by Mo, in the device of Goujon, as a beamformer is a common element found in an ultrasound system to receive the return signals.

Claims 15-17 and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goujon (US 5941826) in view of Guracar et al. (US 6464640) and Mo et al. (US 6142943).

Goujon shows a method for displaying the distribution of a motion characteristic occurring at a region of interest in a two or three dimensional ultrasound image of the body comprising (column 4, lines 5-15): acquiring a sequence of spatially dimensioned ultrasound images in which a motion characteristic is displayed (column 6, lines 10-60); delineating a region of interest (ROI) in one of the images where motion is present in the image (column 7, lines 30-40); processing the motion data from image points of the

delineated ROI to determine the distribution of a motion characteristic as a function of time (column 6, lines 10-60); and displaying the distribution of the motion characteristic as a function of time (column 6, lines 10-60); displaying a spectrogram (the histogram is called a Doppler spectrum, column 6, lines 10-60). Also, the images are color images and can be stored in a buffer (the memory is a buffer, column 6, lines 10-60); displaying an image of the ROI where the spectrogram is concurrently displayed (column 13, lines 35-55, and Figure 8); wherein the motion comprises blood flow velocity (distribution of speed and blood flow rate, column 4, lines 5-15); wherein the motion comprises tissue motion velocity (displacement of vessel walls, column 4, lines 5-15); wherein the motion comprises blood flow velocity derivatives (the amount of blood present is calculated over a change in time, this can be interpreted to be calculating blood flow velocity derivatives, the change in the amount of blood in a particular segment of the vessel over the change in time, column 6, lines 10-60); delineating a plurality of pixels in the images (user selects a vessel of interest to be segmented (delineated), the vessel will comprises a plurality of pixels, column 7, lines 25-40). In addition, Goujon shows that to obtain data regarding the instantaneous blood flow rate, the method can be applied by spatial integration over a section of the blood vessel. That is, the data is acquired from multiple, spatially discrete locations in the blood vessel and analyzed to determine the instantaneous blood flow rate (column 3, line 63-column 4, line 12).

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It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have had a beamformer connected to the ultrasound probe as

taught by Mo, in the device of Goujon, as a beamformer is a common element found in an ultrasound system to receive the return signals.

Response to Arguments

Applicant's arguments filed 6/3/09 have been fully considered but they are not persuasive.

In regards to applicant's arguments regarding Goujon failing to show obtaining values over a plurality of spatially different points, examiner respectfully disagrees. Goujon discloses this in column 3, line 63-column 4, line 12. The technique can be applied (spatially integrated) over a section of the blood vessel, thus including a plurality of spatially different points.

In addition, even assuming that Goujon did not disclose this feature, which the examiner believes Goujon does, applying the pulses over a plurality of spatial locations would be a well known expedient to one of ordinary skill in the art. The Guracar et al. reference is provided to further illustrate that this teaching is known in the prior art. Obtaining data over a region rather than from a single point yields additional useful data regarding the region. In the specific case of blood flow in a blood vessel, applying pulses over a region can aid in locating where a stenosis may be formed, or may aid in calculating specific values related to the blood flow such as blood flow rate, speed, velocity, etc.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan G. Cwern whose telephone number is (571)270-1560. The examiner can normally be reached on Monday through Friday 9:30AM - 6:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Casler can be reached on 571-272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jonathan G Cwern/
Examiner, Art Unit 3737

/BRIAN CASLER/
Supervisory Patent Examiner, Art Unit 3737